

COLLOQUIUM

CRC 1601 HABITATS OF MASSIVE STARS ACROSS COSMIC TIME

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MPIfR Bonn Auf dem Hügel 69 Seminar Room 0.02, 2:00 pm



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Coupled chemical-dynamical simulations of hot cores and hot corinos

The interstellar medium provides an enormous laboratory for the exploration of chemistry of various kinds. Some of the most molecule-rich interstellar objects – known as "hot molecular cores" – are accretions of warm gas and dust that surround young protostars, which ultimately evolve into high-mass stellar systems. Along with their low-mass (solar-type) analogs, "hot corinos", they are characterized by rich rotational emission spectra that exhibit a wealth of organic molecules of varying degrees of complexity. But the formation of these "hot" (>100 K), gas-phase molecules is closely related to an earlier stage of chemistry that occurs on the surfaces of microscopic dust grains at much lower temperatures. Recent observational, experimental and modeling evidence indicates that some of the most complex molecules that we detect in highly evolved protostellar systems may have a much earlier origin than previously thought.

Here I will present new modeling treatments that allow us to trace the continuum of hot and cold chemistry involving interstellar organics. I will also demonstrate some initial results from new coupled radiation hydrodynamics and gas-grain chemical modeling of hot core/corino systems, and our efforts to simulate observations of their molecular line emission.